

Troy Mills Landfill  
Public Comment Period

**PUBLIC HEALTH ASSESSMENT**

**TROY MILLS LANDFILL**

**TROY, CHESHIRE COUNTY, NEW HAMPSHIRE**

**EPA FACILITY ID: NHD980520217**

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Prepared by:

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## Summary

The Troy Mills Landfill (TML), also called the Rockwood Brook Landfill, which is owned by Troy Mills, Inc., is located about 1.5 miles south from the town center of Troy, NH. The owner, a local fabric manufacturer, used the 10-acre landfill, located in a mostly wooded 270-acre property, from 1967 until 2001 as an industrial waste disposal area. The U.S. Environmental Protection Agency (EPA) and the New Hampshire Department of Environmental Services (DES) identified elevated levels of metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs) leaking from containerized waste at the landfill.

In 1992, Troy Mills, Inc. completed a feasibility study detailing a proposed remedy that included capping the inactive disposal area, installing additional monitoring wells, and, if necessary, implementing a groundwater recovery and treatment system. The company in cooperation with the DES then completed a detailed design study. The company filed for bankruptcy protection in 2001 and could not implement the remedial design previously approved by the DES in 2000. On September 26, 2003 the Troy Mills Landfill was added to the **National Priorities List**. Later that year, EPA began a removal action at the site to reduce the spread of contaminants from the landfill to a nearby wetlands area.

### **The National Priorities List.**

The National Priorities List (NPL) is a list maintained by the EPA of the most serious hazardous waste sites identified for possible long-term cleanup. The NPL is part of **Superfund**, which is a federal program created to clean up hazardous waste sites throughout the country.

## **What kind of chemical contamination has been found on the site?**

From 1967 to 1978, an estimated 6,000 to 10,000 drums of liquid wastes and sludges containing Varsol, plasticizers, vinyl resins, pigments and top-coating products were disposed over an approximate 2 acre area. After 1978, the remaining eight acres were used to dispose of waste fabric scraps and other solid waste from the company's manufacturing complex.

Chemical wastes disposed at the site contain a large number of chemical constituents. These chemicals include di (2-ethylhexyl phthalate), di-n-octyl phthalate, acetone, cis-1, 2-dichloroethene, methyl ethyl ketone, methylene chloride, toluene, xylenes, and chromium. These chemicals have been detected in groundwater underlying the site. Of these chemicals, cis-1, 2-dichloroethene and di (2-ethylhexyl phthalate) have been detected in surface water near the site.

## **How might I be exposed to chemical contamination at the site?**

Environmental investigations conducted at the Troy Mills Landfill indicate that contaminated leachate from the drum disposal area has migrated to the nearby

wetlands area through a culvert located under the gravel access road. Individuals who may have accessed this area for recreational purposes could contact contaminated sediments or surface water in this area. Given the low contaminant levels and the low frequency of exposure, it is unlikely that individuals would experience any short-term or long-term health effects associated with these exposures.

The groundwater beneath the drum disposal area has been contaminated with a number of chemical substances associated with past waste disposal practices at the site. This groundwater is not being used as a source of water supply. Individuals are not being exposed to TML-related contaminants in groundwater.

Environmental samples that have been collected in Rockwood Brook downstream from the TML and in Sand Dam Pond do not indicate that these areas have been impacted by releases from the TML. Individuals who swim, wade, or do other recreational activities in Sand Dam Pond are not being exposed to TML-related contaminants.

#### **Exposure Pathways**

A description of the way that a chemical moves from its source (where it began) to where and how people can come into contact with (or get exposed to) the chemical.

ATSDR defines an exposure pathway as having 5 parts:

- Source of Contamination,
- Environmental Media and Transport Mechanism,
- Point of Exposure,
- Route of Exposure, and
- Receptor Population.

When all 5 parts of an exposure pathway are present, it is called a **Completed Exposure Pathway**. Each of these 5 terms is defined in the Glossary.

#### **What health effects might result from exposure to chemical contamination at the site?**

Area residents are only likely to have been exposed to chemical contamination associated with the TML if they came into contact with contaminated surface water and sediments in the wetlands area immediately adjacent to the site. Adverse health effects are not expected to result from these exposures given the low contaminant levels and the low frequency of exposure. Likewise, area residents who recreate in Sand Dam Pond are not at health risk because contamination related to the TML has not been found in this water body.

#### **Adverse Health Effects**

A change in the body function or the structures of cells that can lead to disease or health problems.

#### **Could current or past exposures to chemical contamination at the site have caused an increased rate of cancer in the community?**

No. Given the low levels of contaminants found and the limited opportunities for exposure at the site, exposure to potential cancer causing chemicals should not result in increased cancer rates in the community.

#### **Is the site being cleaned up?**

Yes. In late 2003, EPA began work to construct a temporary containment system at the site. EPA installed three separate interceptor trenches, each one totaling approximately

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100 feet, to intercept groundwater contaminants seeping into nearby wetlands. Once the containment system is operational, DES will remove floating contamination for disposal at an off site location. Now that the TML has been added to the National Priorities List (Superfund), it is eligible for clean up under the Superfund program. Individuals who are interested in this issue should contact the Regional Office of EPA for additional information.

**Where can I get more information?**

The text and appendices of the Public Health Assessment contain more information about the health issues discussed in this summary. To ask questions about this Public Health Assessment or to obtain extra copies of this document, please contact Dennis Pinski in the New Hampshire Department of Health and Human Services, Bureau of Environmental and Occupational Health at (603) 271-6909 or (800) 852-3345 ext. 6909 (toll-free in New Hampshire). You can also send an e-mail to the Bureau by visiting it's website at: <http://des.nh.gov/EOH>

**Public Health Assessment**

A report or document that evaluates chemical releases at a hazardous waste site and determines if people could be harmed from coming into contact with those chemicals. The PHA also identifies if further public health actions are needed.

Additional copies of this Public Health Assessment will be made available at the Troy and Fitzwilliam Town Halls and Public Library in Troy, NH.

If you would like more information on the site cleanup efforts, please contact Tom Hatzopoulos of the EPA at (617) 918-1284 or John Splendore of the DES at (603) 271-5569.

**I. PURPOSE**

On May 1, 2003, the U.S. Environmental Protection Agency (EPA) proposed the Troy Mills Landfill Site for the National Priorities List (NPL).

Under 42 U.S.C. 9604, the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) must perform a Public Health Assessment for all sites proposed for the NPL within one year of the date of listing. A Public Health Assessment is a triage tool used by public health agencies to determine if any actions are needed to protect the community surrounding the hazardous waste site, and to determine if follow-up health activities (e.g., health studies, medical surveillance) should be done. To achieve this goal, this assessment contains three types of evaluations: (1) the identification of pathways of exposure to site contaminants and an evaluation of their public health implications; (2) a discussion of relevant and available health outcome data; and (3) an evaluation of specific community health concerns about the site.

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The New Hampshire Department of Health and Human Services (DHHS), Bureau of Environmental and Occupational Health (BEOH) is preparing this Public Health Assessment under a cooperative agreement with ATSDR.

## **II. BACKGROUND AND STATEMENT OF ISSUES**

### **A. Site Description and History**

The Troy Mills Landfill (TML) is located in a predominantly undeveloped woodlands area about 1.5 miles south of the town center in Troy, New Hampshire (Figure 1). The approximately 10-acre TML is located in the southeastern portion of a 270-acre land parcel, which is owned by Troy Mills, Inc. The property is bordered to the north by an intermittent stream; to the east by a former railroad bed (currently utilized as a walking, all terrain vehicle and snowmobile trail); to the south by the eastern branch of Rockwood Brook; and to the west by a gravel access road, a wetlands area and Rockwood Brook. Rockwood Brook flows in a northerly direction for about 1.0 mile to where it enters Sand Dam Pond and Sand Dam Pond Beach, a town recreational area (Figure 2)[1].

Prior to 1967, the TML was reportedly undeveloped. Beginning in 1967, Troy Mills, a manufacturer of synthetic fabrics [2], began using the site to dispose of 55- gallon drums of waste liquids and sludge. The drummed wastes consisted primarily of plasticizers and Varsol, a petroleum-based solvent, also known as Stoddard solvent or mineral spirits. Other wastes disposed at the landfill included pigments, and tank residues of vinyl resins and top-coating products [3]. The waste drums were disposed in a two-acre section of the landfill known as the drum disposal area [1]. It's estimated that an average of 15-20 drums of waste were disposed in this area per week. Many of the buried drums were dumped from trucks into trenches and reportedly compacted under the weight of heavy equipment [3]. Many of the buried drums were reportedly crushed or partially crushed in the process. Test pits conducted in the drum disposal area by EPA in September 2002 revealed that about two thirds of the uncovered drums still contained liquids or sludges. The total number of waste drums disposed at the site has been estimated to be between 6,000 and 10,000 [4]. In addition to the drummed wastes, solid wastes such as scrap fabric, metal strapping, and fiberboard drums were also disposed in the TML, primarily in the remaining 8-acre section [3].

Following an inspection of the TML in 1978, the New Hampshire Bureau of Solid Waste Management (NH SWM) required Troy Mills to apply for a permit to operate a sanitary landfill [5]. The continued disposal of drummed chemical wastes at this location was disallowed at that time. Troy Mills was subsequently authorized to dispose of limited solid waste items (waste fabrics and damaged, non-recyclable empty 55-gallon drums) in the TML. These solid wastes were disposed in the remaining 8-acre portion of the TML [6]. In 2001, after Troy Mills filed for bankruptcy protection, the TML ceased operations at the DES' direction.

Prior to 1980, several outbreaks of oily, orange-colored leachate were discovered in drainage ditches located between the landfill area and the gravel access road. The leachate was observed to flow and spread out within the wetland area to the west of the access road [1].



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Between 1980 and 2001, a number of environmental investigations of the TML property were conducted in order to characterize the nature and extent of contamination at the site. The public is referred to the EPA Final Expanded Site Inspection Report for Troy Mills Landfill Troy, New Hampshire, dated January 21, 2003 for a detailed discussion of the environmental investigations and regulatory actions that were undertaken during this time. A brief summary of the findings of investigations that were conducted between 1980 and 2001 is as follows:

- An estimated 6,000-10,000 waste drums were disposed in the 2-acre drum disposal area of the 10-acre TML between 1967 and 1978.
- An indeterminant number of waste drums disposed at the TML are suspected of containing liquid and sludge wastes, consisting primarily of plasticizers and Varsol.
- Solid wastes in the form of discarded synthetic fabrics and other materials were disposed in the remaining 8-acre portion of the TML.
- Groundwater in the TML area has been contaminated by a number of chemical contaminants but the direction of groundwater flow is away from inhabited areas. Groundwater proximate to the TML is not being used as a source of water supply.
- Leachate from the TML has migrated to the wetland area to the west of the TML and has caused observable orange staining of the wetland soils.
- Migration of contaminants through leachate appears to be limited to the wetland area and the section of Rockwood Brook directly adjacent to the landfill.
- Surface water in Rockwood Brook as it leaves the TML area has not been significantly impacted by contaminants released from the TML. Contaminants of concern have not been detected in Sand Dam Pond (Figure 3).

In 1985, DES and Troy Mills, Inc. entered into a consent order that required remedial work at the landfill [7]. In 1992, Troy Mills, Inc. submitted a feasibility study for TML that included a proposed remedy for capping the drum disposal area, installing additional monitoring wells, and implementing a contingency groundwater recovery and treatment system [1]. In early 2000, DES approved a containment remedy for the drum disposal area of the TML that was a modified version of the capping-based remedial action that had been proposed earlier. Later in the year, Troy Mills requested and received NH DES approval to temporarily defer implementation of the containment remedy because of unfavorable corporate financial and market conditions. DES approved this deferral based on the TML's remote location and that monitoring data did not suggest an imminent and substantial threat to public health and the environment [8][9].

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In July 2001, DES requested EPA to initiate an Expanded Site Inspection (ESI) and Hazard Ranking System in the event that Troy Mills became unable to undertake remediation of the site [1]. In October 2001, Troy Mills filed for Chapter 11 Bankruptcy protection. In December 2001, as part of the ESI process, EPA collected soil and leachate samples from the TML and sediment and surface water samples along the surface water pathway to assess the potential impact of contaminant migration from the TML to downstream surface water bodies [10]. At DES' direction, Troy Mills ceased disposal at the TML by the end of 2001. In February 2002, DES notified Troy Mills that the previously approved containment remedy (approved as a compromise because of the company's appeal related to its unfavorable financial condition) was no longer acceptable. This position was taken because the company could not afford to implement or operate the approved remedy. Accordingly, DES requested the EPA Site Remediation and Restoration Branch to consider a removal action at the site [9].

Following completion of the Hazard Ranking System package, the Troy Mills Landfill was proposed for listing to the National Priorities List (NPL) on April 30, 2003. In September 2003, EPA announced the beginning of construction of a temporary containment system for the landfill. The containment system consists of three separate interceptor trenches, with each trench approximately 100 ft. in length. The system is intended to intercept floating contamination in groundwater before it can reach the wetlands area. The intercepted floating free product would be periodically removed for off-site disposal. The containment system has been constructed and a test period is underway [11].

### **B. Site Visit**

On July 17, 2003, representatives of DHHS accompanied by ATSDR, DES and local town officials, conducted a site visit at the Troy Mills Landfill site. EPA joined participants during the visit. The site visit included a tour of the actual landfill area where drums and solid wastes were buried, the wetlands area adjacent to the landfill, and access points used by possible trespassers. Approximately three hours were spent viewing the site and nearby areas of concern within the community. During the site visit, DHHS and the other agencies observed:

- Unearthed fabric materials in the solid waste disposal area
- Tire tracks in the sand and dirt assumed to be from motor bikes or ATVs
- The flow of Rockwood Brook north to the site boundary
- Residential properties closest to the TML in Troy and Fitzwilliam
- Sand Dam Pond, the Town recreational area

### **C. Demographics and Land Use**

According to the U.S. Census, the population of Troy in 2000 was 1,962 persons. Of particular interest are the populations of children and senior citizens. These are groups are typically considered "sensitive" to the effects of environmental

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pollution, i.e., they may be affected by lower levels of contaminants, or they may have more serious reactions to these contaminants. Children less than 5 years old and adults 65 years old and greater account for 16.2% of the Troy population (Figure 4). The age distribution for the population is summarized in the following table.

| <b>Age (years)</b> | <b>Persons</b> | <b>Percentage</b> |
|--------------------|----------------|-------------------|
| Under 5 years      | 117            | 6.0               |
| 5 to 9 years       | 143            | 7.3               |
| 10 to 14 years     | 172            | 8.8               |
| 15 to 19 years     | 143            | 7.3               |
| 20 to 24 years     | 108            | 5.5               |
| 25 to 34 years     | 255            | 13.0              |
| 35 to 44 years     | 353            | 18.0              |
| 45 to 54 years     | 290            | 14.8              |
| 55 to 59 years     | 107            | 5.5               |
| 60 to 64 years     | 74             | 3.8               |
| 65 to 74 years     | 105            | 5.4               |
| 75 to 84 years     | 79             | 4.0               |
| 85 years and over  | 16             | 0.8               |

#### **D. DHHS Involvement**

After the site was proposed for listing on the NPL on April 30, 2003, DHHS began work on a Public Health Assessment. To date, DHHS staff have performed a site visit and conducted outreach activities with the nearby community. Highlights of DHHS involvement are provided below.

- **July 17, 2003** – DHHS staff visited the site with ATSDR, DES, EPA, Troy selectmen and environmental consultants to observe current conditions of the site.
- **September 23, 2003** – DHHS held a public availability session and distributed an educational needs assessment survey to the residents in the neighborhood near the site. The objective of the needs assessment survey was to gather community health concerns and questions regarding the site so that these could be addressed in the public health assessment. Residents of the community were provided the opportunity to meet with DHHS staff, in a confidential setting, to discuss their personal health concerns and questions regarding the Troy Mills Landfill.
- **October 1, 2003** – An article was published in the Troy Town News to explain the purpose of the Educational Needs Assessment that individuals would be receiving in the mail in early November.

- **November 4, 2003** – A DHHS Health Promotion Advisor met with Selectmen to distribute posters, provide the post office with a mass mailing, and place drop boxes throughout Troy for the easy retrieval of the Educational Needs Assessment.
- **November 6, 2003** – DHHS Educational Needs Assessment surveys were sent out as a mass mailing by the Troy Post Office.
- **November 2003** – An article was placed in the Troy Town News to remind residents of the purpose of the Educational Needs Assessment including information on when and how to return the information to DHHS.
- **December 2003** – An article in the Troy Town News thanked the Town Selectmen for their assistance and survey respondents for their participation in the Educational Needs Assessment.

#### **E. Quality Assurance/Control (QA/QC)**

In preparing this document, DHHS relied on the information provided in the referenced documents. Only data collected using appropriate sampling and laboratory methods were considered in this analysis. Data with demonstrated QA/QC problems were excluded from summary tables or exposure calculations unless they provided unique and relevant information. DHHS has confidence in the data for the site because certified laboratories performed the analyses. Measurements of exposure point concentrations were taken directly from laboratory data sheets to avoid transcription errors.

### **III. DISCUSSION**

#### **A. Assessment Methodology**

To determine whether area residents are exposed to contaminants from the site, it is necessary to evaluate the environmental and human components that lead to human exposure (pathways analysis). This pathways analysis consists of five elements: (1) a **source** of contamination; (2) transport of contaminants through an **environmental medium**; (3) a **point** of human exposure; (4) a **route** of human exposure; and, (5) a **receptor population**. Exposure pathways can be classified into three groups: (1) **completed pathways**; i.e., those in which human exposure to contaminants is reasonably likely to have occurred, is occurring, or is likely to occur in the future; (2) **potential pathways**; i.e., those in which at least one of the five exposure elements is missing; and, (3) **eliminated pathways**; i.e., those that can be eliminated from further analysis because one of the five elements is missing and will never be present, or in which no contaminants of concern can be identified.

After the pathways are designated as completed, potential, or eliminated, the next step is to obtain representative environmental monitoring data for the site of concern and to compile a list of site-related contaminants. This list of contaminants is compared to health-based comparison values (HCVs) to identify those contaminants that do not have a realistic possibility of causing adverse health effects. These comparison values are conservative, because they include ample safety factors that account for the most sensitive populations. HCVs are typically used as follows: if a contaminant is never found at levels greater than its comparison value, it is reasonable to conclude that the contaminant does not represent a public health concern. For contaminants that do not exceed their respective HCVs there is no need for further evaluation. If, however, a contaminant is found at levels greater than its HCV, the pollutant is designated as a contaminant of concern and it needs to be further examined. Since HCVs are based on conservative assumptions, the presence of contaminant concentrations greater than a HCV does not necessarily mean that adverse health effects will result for those individuals who are exposed to the contaminants. More information on comparison values can be found in Appendix D.

For chemical contaminants that have been designated as contaminants of concern, the next step is to evaluate site-specific conditions to determine what exposure scenario is realistic for a given exposure pathway. Given this exposure scenario, it is possible to determine a dose and compare this dose to scientific studies to determine whether the extent of exposure indicates a public health hazard.

## **B. Environmental Contamination**

The following represents a brief overview of the chemical contaminants identified in different environmental media at the TML.

### **1. Drum Disposal Area**

Analytical results of waste samples and subsoil samples collected in the drum disposal area between 1981 and September 2002 have indicated the presence of a number of volatile organic compounds (VOCs) including benzene, methylcyclohexane, toluenes, xylenes, 1,1,1-trichloroethane (1,1,1-TCA), trichloroethylene (TCE), methylene chloride and vinyl chloride; semi-volatile organic compounds (SVOCs) including naphthalene, 2-methylnaphthalene, pentachlorophenol, diethylphthalate, bis(2-ethylhexyl)phthalate (DEHP), di-n-butyl phthalate, benzyl butyl-phthalate, and di-n-octyl phthalate; and inorganic elements, including aluminum, antimony, cadmium, chromium, copper, iron, lead, manganese, nickel, selenium, sodium, and zinc [1].

Contaminants that have been detected in subsurface soil/source samples at concentrations exceeding the DES upper concentration limits for soils in New Hampshire include toluene (maximum detected concentration of 300 ppm in

1983), and DEHP (maximum detected concentration of 69,000 ppm in 1983 and 13, 000 ppm in 2002) [1].

## **2. Groundwater**

Groundwater in the overburden and bedrock beneath the drum disposal area flows west and northwest, discharging to Rockwood Brook. Analytical results of groundwater samples collected from the overburden groundwater between 1982 and November 2001 have indicated the presence of a number of VOCs, SVOCs and inorganic elements. Contaminants that have been detected in the past at concentrations above DES Ambient Groundwater Quality Standards include acetone, carbon disulfide, several chlorinated VOCs, methyl ethyl ketone, toluene, DEHP, naphthalene, cadmium, chromium, and lead.

Groundwater sampling data has shown a decrease in contaminant level concentrations for several contaminants over the approximate 20-year sampling period (Table 1) [1]. A floating product layer of light non-aqueous phase liquid (LNAPL) that contained DEHP, methylene chloride, naphthalene and chromium had been discovered in groundwater near the drum disposal area. In December 2001, EPA's Superfund Technical Assessment and Response Team (START) collected a sample from the LNAPL layer at a location between the drum disposal area and the access road. This sample showed elevated concentrations of DEHP (250,000 ppm), di-n-octyl phthalate (12,000 ppm) and other contaminants associated with the site (Table 2). Given the distance and direction of known drinking water supply wells, no impacts to nearby drinking water sources are known or expected [2]. Based on chemical analysis results, the release of contaminants and the migration of contaminated groundwater to the wetlands area closest to TML have been demonstrated.

## **3. Surface Water**

Surface water runoff from the solid waste landfill area flows west toward Rockwood Brook located some 30 to 50 yards away (Figure 2). Surface water runoff from the drum disposal area flows southwest to the eastern branch of Rockwood Brook. Contaminated groundwater flowing from beneath the drum disposal area discharges as landfill leachate into drainage ditches located between the landfill and the gravel access road. Leachate in the southernmost drainage ditch then flows through a culvert under the access road to the wetland area situated west of the landfill [1].

Surface water samples collected between 1987 and November 2001 have detected low levels of VOCs, SVOCs and inorganics in this wetland area [1]. More recent sampling conducted by START in December 2001 in this wetland area has again detected low levels of these contaminants (Table 3). During 2001, DES collected surface water and sediment samples in Sand Dam Pond (Figure 3). No VOCs, SVOCs or inorganics were detected in the surface water sample collected at this

time [12]. The Town of Troy conducted its own sampling of surface water at Sand Dam Pond during 2002 [13]. No contaminants were detected at levels above health comparison values.

#### **4. Sediment Samples**

As indicated in the previous section, surface water runoff from the drum disposal area and solid waste area flows toward Rockwood Brook. Contaminated groundwater discharges as landfill leachate into a drainage area located to the west of the landfill and, from there, to the adjacent wetland area through a culvert under the gravel access road. Sediment samples collected in Rockwood Brook in 1995 indicated the presence of low levels of several inorganic compounds and one pesticide, methoxychlor (2.3 ppb). Based on background sampling data that was collected as part of this effort, it was not clear whether these contaminant concentrations are attributable to the TML or if they may be associated with other potential off-site sources or from tributaries discharging to Rockwood Brook [1].

In December 2001, START collected seven sediment samples in the wetland area bordering the TML to document the release of contaminants from the landfill. Analytical results of these samples indicated elevated levels of two VOCs, cis-1, 2-DCE (42 ppb), and toluene (21 ppb); one SVOC, DEHP (2.3 ppm); and several inorganics, including manganese (5,758 ppm). These contaminant concentrations are below a level of health concern (Table 4).

DES collected sediment samples in Sand Dam Pond during 2001. No VOCs or SVOCs were detected. Low concentrations of chromium (16 ppm) and lead (42 ppm) were found but DES did not attribute these inorganics to contaminant migration from the site [12]. The concentrations are within the ranges considered to be “background” levels for these substances in New Hampshire soils [14]. DES has stated that the presence of these contaminants could represent normal background levels or may be attributable to other sources [12].

#### **C. Analysis of Exposure Pathways**

Environmental contamination cannot affect a person’s health unless he or she comes into physical contact with it. Moreover, human contact with environmental contamination is only possible when a completed exposure pathway exists. A completed exposure pathway exists when all of the following five elements are present: (1) a source of contamination, (2) transport through an environmental medium, (3) a point of exposure, (4) a route of human exposure, and (5) an exposed population. For the Troy Mills Landfill, the various exposure pathways are discussed in the following sections.

## **1.Completed Exposure Pathways**

### Recreational/Trespassers Pathway

| <b>Name</b>                    | <b>Source</b>   | <b>Environmental Transport and Medium</b> | <b>Exposure Point</b>   | <b>Exposure Route</b> | <b>Exposed Population</b> | <b>Time Frame</b>   |
|--------------------------------|-----------------|---|-------------------------|-----------------------|---------------------------|---------------------|
| Recreational/Trespassing (TML) | Landfill Wastes | Leachate                                  | Sediments/Surface water | Ingestion Dermal      | Recreators/Trespassers    | Past Present Future |

The TML is located in an area of mostly undeveloped woodlands. To the east of the site is a former railroad bed that is currently used as a walking, all terrain vehicle (ATV) and snowmobile trail. There is a gravel access road that runs adjacent to the wetlands area between the drum disposal area and Rockwood Brook. Although there is gate on the road that is kept barred, the site itself is not fenced and is accessible to trespassers. A completed exposure pathway exists for individuals who recreate or trespass (hikers, children who play, etc.) in this area. The elements of this pathway are identified in the above table. These individuals may have come into contact with contaminants in the drainage ditch and wetlands sediments. It's not likely, however, given the limited opportunities for exposure, and the generally low levels of contaminants that have been detected in these media, that actual exposures would result in adverse health effects.

## **2. Potential Exposure Pathways**

### Air Pathway

| <b>Name</b> | <b>Source</b>   | <b>Environment al Transport and Medium</b> | <b>Exposure Point</b> | <b>Exposure Route</b> | <b>Exposed Population</b> | <b>Time Frame</b>   |
|-------------|-----------------|--|-----------------------|-----------------------|---------------------------|---------------------|
| Air         | Landfill Wastes | Soil Vapor                                 | Ambient Air           | Inhalation            | Trespassers to the TML    | Past Present Future |

The area where the TML is located is remote from any habitable areas. As indicated above, although the TML has been posted, it's possible for individuals to access the area for walking, snowmobiling and other types of recreational activities. Some residents have expressed a concern about the possibility of breathing vapors from the contaminated waste materials in the drum disposal area while hiking or doing other recreational activities near the site. During the ESI investigations in 2001, ambient air was screened by START using Photo Ionization Detectors and Flame Ionization Detectors. No sustained elevated concentrations of VOCs in ambient air were detected during this time. However, START did detect elevated concentrations of VOCs in the headspace of a



monitoring well located adjacent to the drum disposal area and directly above several sample locations in the TML (1).

Although there is no indication that trespassers or other individuals accessing the TML are being exposed to elevated levels of VOCs. The inhalation of vapors in the drum disposal area of the TML constitutes a potential exposure pathway.

### **3. Eliminated Exposure Pathways**

Groundwater beneath the drum disposal area has been contaminated by a number of chemicals originating from the site. The direction of groundwater flow is westward, away from any inhabited areas located near the TML. Local residents are not using this contaminated groundwater as a source of drinking water. Since residents are not being exposed to contaminants through their drinking water, and it is extremely unlikely that contaminated groundwater would ever be allowed to be used as a drinking water supply, this pathway has been eliminated and will not be considered further in this assessment.

#### **D. Public Health Implications of Exposure**

Environmental investigations have documented the movement of contamination from the drum disposal area to the wetlands area adjacent to, and immediately west of, the TML. Exposure to contaminants in surface water and sediments is possible, therefore, for individuals who recreate or trespass in this area. The sampling data available has shown low levels of contaminants [primarily di (2-ethylhexyl) phthalate, manganese and cis-1,2-dichloroethene] in surface water in this area.

**Di (2-ethylhexyl) phthalate**, also known as bis (2-ethylhexyl) phthalate or DEHP, is a synthetic chemical that is commonly added to plastics to make them flexible. Due to its many applications and uses in commercial products, DEHP is commonly found in the environment. When present in soil and water, it breaks down readily as the result of microbial action. There is little available information on the human health effects associated with exposure to DEHP at concentrations normally found in the environment. Exposure to high levels of DEHP in laboratory test animals has been shown to cause liver damage. Humans absorb and breakdown DEHP differently than laboratory animals. It is not clear that humans would experience the same problems as has been noted in these laboratory studies. The EPA has classified DEHP as a probable human carcinogen (capable of causing cancer) [15].

DEHP has been found in surface water near the site at a level exceeding its health comparison value. Given the limited frequency of detection, low concentration, and limited opportunities for contact with this contaminant in surface water, exposure to DEHP is not likely to result in adverse health effects.

**Cis-1, 2-dichloroethene** is used in the manufacture of solvents and is present in many chemical mixtures. There is little information on the long-term health effects for humans associated with exposure to low levels of this compound in water or other environmental media. Cis-1, 2-dichloroethene is not considered to be a human carcinogen [16]. At the low concentrations detected (maximum detected concentration 200 ppb) and the limited frequency that recreators or trespassers would come into contact with this contaminant in this medium, exposure to cis-1, 2-dichloroethene in surface water near the TML is unlikely to result in any adverse health effects.

**Manganese.** There is very little information available about the human health effects associated with ingestion of manganese. Motor coordination problems have been reported for children who were exposed to above-average concentrations of manganese in food and water. There were flaws in the studies that reported these results, however. It is not clear if the motor coordination problems were the result of consuming manganese or if other factors were involved [17].

Manganese was detected in surface water near the TML site at a concentration exceeding its respective health comparison value, as well as, the State of New Hampshire Drinking Water Standard. Surface water near the TML is not used as a source of drinking water. Given the limited frequency of exposure and the unlikelihood that recreators or trespassers would accidentally ingest large quantities of surface water, exposure to manganese is not expected to result in adverse health effects.

#### IV. HEALTH OUTCOME DATA

Health outcome data were not evaluated for this site for the following reasons:

- A large exposed population is needed for a health outcome data analysis to provide meaningful results. The number of individuals who may have come into contact with contaminated sediments and surface water in the nearby wetlands area is likely very small.
- Given the low contaminant levels that exist in these media coupled with the limited opportunities for exposure (distance to populated areas, frozen ground conditions during part of year, etc.), it is very unlikely that any health effects associated with actual exposure to site contaminants, could be detected through a health outcome data review.

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Some local residents have expressed a concern about cancer rates in the community. The State of New Hampshire maintains a cancer registry for cancer incidences. Information from the New Hampshire State Cancer Registry is available at: <http://www.dhhs.state.nh.us/DHHS/BHSDM/LIBRARY/Data-Statistical+Report/cancer-mortality98-99.htm>

Information can also be obtained by contacting the Bureau of Health Statistics and Data Management at telephone (603) 271-5926 or toll free at 800-852-3345 ext. 5926.

## **V. COMMUNITY HEALTH CONCERNS**

When performing any public health assessment, DHHS gathers information from local residents about health concerns associated with the site. The health concerns that local residents express are then addressed in the public health assessment. At the Troy Mills Landfill site, DHHS accomplished this task through two activities:

- On September 23, 2003, DHHS held a public availability session at the Troy Elementary School. Town residents of Troy and Fitzwilliam had the opportunity to meet with DHHS staff, in a confidential setting, to discuss their health concerns and questions regarding the Troy Mills Landfill site. The public availability session was advertised in the local news media.
- On November 6, slightly over 1,000 needs assessment surveys were sent to residents of Troy and Fitzwilliam. The survey was supported by the local town selectmen and was advertised in the local Troy Newspaper along with flyers that were posted at the post office, the library and the Troy town hall.

The following is a list of questions gathered during the public availability session and the needs assessment survey with DHHS and ATSDR's responses. Since the residents' concerns are considered confidential, all comments have been paraphrased to protect the identity of the respondent.

### **1. Is it safe for my family to participate in recreational activities like swimming, canoeing, and fishing at Sand Dam Pond?**

Yes. In the past few years, EPA, DES and the Town have sampled Sand Dam Pond. The chemical analyses of surface water and sediment samples collected during 2001-2002 do not indicate that there is a hazard associated with the use of this water body for recreational purposes. Recreational activities such as swimming, wading, and fishing conducted in Sand Dam Pond should not present a health risk.

**2. What kinds of chemicals are located at the Troy Mills Landfill Site? Will they spread? What kinds of health effects are associated with these chemicals? Do they have a long-term effect?**

Between 1967 and 1978 chemical wastes in the form of plasticizers, Varsol (mineral spirits), pigments, vinyl resins and top-coating products were disposed in the TML. These wastes consist of a large number of VOCs, SVOCs, and inorganic compounds. Investigations conducted between the early 1980s and 2001 have shown that the groundwater beneath the drum disposal area has been contaminated by a large number of these compounds. Some of these contaminants have leached into the drainage ditch located down slope from the disposal area and from there have migrated to the wetland area located to the west of the TML. The spread of contamination appears to be limited to the section of Rockwood Brook and the wetlands area to the west and immediately adjacent to the drum disposal area. Sand Dam Pond, located downstream from Rockwood Brook, has been sampled several times in recent years and has not been affected. The TML was proposed for listing to the National Priorities List in spring 2003. Efforts to monitor contamination will continue while EPA and DES work long term to clean up the site.

Individuals who came into contact with sediments or surface water in the wetlands area adjacent to the TML area may have been exposed to contaminants originating from the site. The levels of contamination are low. It is unlikely, given the low contaminant concentrations, frequency of contact and other circumstances related to exposure, that harmful health effects would occur.

**3. Is the site being cleaned up, what is happening to the chemicals that have been found here?**

The TML has been proposed for listing on the National Priorities List, or Superfund. The EPA and DES will work to insure that the site is cleaned up so that it will not become a hazard to public health and the environment. The EPA recently completed construction of a temporary containment system to limit the migration of contaminated groundwater from the landfill to the wetland area bordering the site. The EPA will remove contaminated product collected by this system to an off site location for disposal. In April 2004, EPA secured funding for \$8,000,000 to remove buried waste drums at the TML. This removal action should be completed by the end of this year.

**4. How will the Troy Mills Landfill site affect the water supply in Rockwood Brook, Sand Dam Pond, and the drinking water?**

Investigations conducted to date indicate that the wetland area to the west of the TML has been impacted by the migration of contaminants in surface water run off and leachate from the drum disposal area. These investigations have also indicated that there has been no significant migration of site related contaminants to downstream sections of Rockwood Brook or to Sand Dam Pond. Environmental sampling conducted at Sand Dam Pond does not indicate that there is a hazard associated with the recreational use of this water body.

Public and private drinking water supplies have not been affected by contamination from the TML. Groundwater beneath the drum disposal area has been contaminated by a number of chemical contaminants associated with the site. There are no drinking water wells located close to the site. The direction of the contaminated groundwater flow is away from habitable areas of Troy and Fitzwilliam. DES has offered to sample local residents' drinking water wells to insure that they are not being exposed to site-related contaminants in their water supplies. The major source of contamination (buried drums) is to be removed by EPA, beginning in the summer of 2004. After the removal action is completed the threat of chemicals in the buried drums affecting the Brook and Sand Pond will be eliminated.

**5. Could current or past exposures to chemical contamination at the site have caused an increased rate of cancer in the community?**

Given the low levels of contaminants found at the site coupled with the limited opportunities for exposure (distance to populated areas, frozen ground conditions during part of year, etc.), increased cancer rates are not expected in the community.

Some local residents have expressed a concern about cancer rates in the community. Any concerns about cancer rates in the community can be directed to the New Hampshire State Cancer Registry. The State of New Hampshire maintains a cancer registry for cancer incidences.

Information is available at:

<http://www.dhhs.state.nh.us/DHHS/BHSDM/LIBRARY/Data-Statistical+Report/cancer-mortality98-99.htm>

## **VI. CHILDREN'S HEALTH CONSIDERATIONS**

DHHS has prepared this Public Health Assessment under a cooperative agreement with ATSDR. DHHS has included the following information in accordance with the ATSDR's Child Health Initiative.

Children can be at greater health risk than adults from exposure to hazardous substances released into the environment. Children spend a good deal of time outdoors and, therefore, have an increased likelihood of coming into contact with harmful chemicals that may be present in soil, air and water. Children are shorter in stature than adults and their breathing zones are closer to the ground (increasing the likelihood that they may breathe dust, soil, and heavy vapors). Children are also smaller, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if certain toxic exposures occur during critical growth stages. Most importantly, children depend completely on adults for risk identification and management decisions, where they live, and access to medical care.

In the past, individuals, including children, who hiked, fished or did other recreational activities in the wetland area bordering the TML, may have come into contact with contaminated leachate or surface water. Given the limited frequency of detection, low concentrations, and limited opportunities for exposure, it is unlikely that these exposures would have resulted in any adverse health effects.

## **VII. CONCLUSIONS**

Individuals who recreate or trespass (hikers, children who play, etc.) in the wetlands area bordering the TML may have come into contact with chemical contaminants in the drainage ditch, surface water and sediments. It's not likely, however, given the limited opportunities for exposure, and the generally low levels of contaminants that have been detected in these media, that actual exposures would result in adverse health effects.

Groundwater beneath the TML is contaminated with a number of chemicals associated with the site. There are no exposures to site contaminants in drinking water, however, because area residents are not using this contaminated groundwater as a source of water supply.

Some local residents have expressed concerns about the possibility of breathing VOCs from buried wastes in the drum disposal area. Field screening performed during previous site investigations did not indicate that airborne releases were a concern. There are no indications that area residents are being exposed to high levels of VOCs in ambient air at the TML. It is possible that contaminant releases to ambient air could occur during the proposed drum removal action scheduled for

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later in 2004. DHHS can re-evaluate this exposure pathway if air-sampling data becomes available.

There are also community concerns about swimming, wading and other recreational activities that are conducted in Sand Dam Pond. An evaluation of environmental sampling data (surface water and sediments) collected in recent years does not indicate that Sand Dam Pond has been impacted by chemical releases from the TML. Individuals who recreate in Sand Dam Pond are not at health risk from chemical contaminants associated with the site.

DHHS did not evaluate health outcome data for the community in relation to the Troy Mills site for the following reasons:

- A large exposed population is needed for a health outcome data analysis to provide meaningful results. The number of individuals who may have come into contact with contaminated sediments and surface water in the nearby wetlands area is likely very small.
- Given the low contaminant levels that exist in these media coupled with the limited opportunities for exposure (distance to populated areas, frozen ground conditions during part of year, etc.), it is very unlikely that any health effects associated with actual exposure to site contaminants, could be detected through a health outcome data review.

Some local residents have expressed a concern about cancer rates in the community. Any concerns about cancer rates in the community can be directed to the New Hampshire State Cancer Registry. The State of New Hampshire maintains a cancer registry for cancer incidences.

Information is available at:

<http://www.dhhs.state.nh.us/DHHS/BHSDM/LIBRARY/Data-Statistical+Report/cancer-mortality98-99.htm>

Based on a review of available site information, DHHS and ATSDR conclude that, although trespassers in the wetlands area bordering the TML may have been exposed to site related contaminants in sediments and surface water, the exposures are not at levels expected to cause adverse health effects. Since there are opportunities for exposure but adverse health effects from these exposures are unlikely, DHHS has categorized the TML as No Apparent Public Health Hazard according to the ATSDR hazard classification system (see Appendix F). Site remediation is needed, however, because changes in land use in the area of the TML could occur in the future.

Information can also be obtained by contacting the Bureau of Health Statistics and Data Management by telephone at (603) 271-5926 or toll free at 800-852-3345 ext. 5926.

## **VIII. RECOMMENDATIONS**

DHHS will evaluate new environmental data to determine if there is a health concern, especially as new data relate to potential exposures to air.

## **IX. PUBLIC HEALTH ACTION PLAN**

The purpose of the Public Health Action Plan is to ensure that this document not only identifies any current or potential human health hazards, but also provides a plan of action to mitigate and prevent injuries or human health effects resulting from exposures to hazardous substances at the site. The first section of the Public Health Action Plan contains a description of completed or ongoing actions to mitigate exposures to environmental contamination. In the second section, there is a list of additional public health actions that will be implemented in the future.

### ***Completed or Ongoing Actions***

- Between 1980 and 2001, a series of environmental investigations were conducted to characterize the nature and extent of contamination at the site.
- In May 2003, EPA proposed the Troy Mills Landfill for the National Priorities List (Superfund).
- EPA, DES and the Town of Troy have sampled surface water and sediments in Sand Dam Pond.
- EPA is currently conducting a removal action to restrict the migration of contaminated groundwater at the site.

### ***Planned Actions***

- EPA will complete the ongoing removal action.
- EPA will conduct a Remedial Investigation/Feasibility Study (RI/FS) as part of the Superfund process.
- EPA will conduct a separate removal action to remove the estimated 6,000-10,000 buried drums to an off-site location.



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- DES will test local residents' private drinking water wells if requested.
- DHHS will evaluate any additional sampling data that becomes available for the Troy Mills Site that may indicate a future hazard to the community.

## **X. PREPARERS OF REPORT**

Dennis Pinski, Supervisor  
Vickie Shallow, Health Promotion Advisor  
Todd Hudson, Human Health Risk Analyst

Bureau of Environmental and Occupational Health  
Office of Community and Public Health  
New Hampshire Department of Health and Human Service  
29 Hazen Drive  
Concord, NH 03301-6504

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**APPENDIX A**

**FIGURES**

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**APPENDIX B**

**TABLES**

**Table 1**

**Summary of Troy Mills Landfill Groundwater Monitoring  
Conducted Between 1982 and 2001**

| <b>Chemical</b><br>Troy Mills Landfill<br>Public Comment Period | <b>Maximum Concentrations<br/>Detected between May 1982<br/>and November 2001 (ppb)</b> | <b>Sample Date<br/>Associated with<br/>Max. Concentration</b> | <b>2001</b> | <b>Health Based<br/>Comparison Value<br/>(ppb)</b> | Reference             |
|---|---|---|-------------|--|-----------------------|
| <b><i>VOCs</i></b>  |   |   |             |  |                       |
| Acetone   | 790 <sup>a</sup>  | 7/95  | ND          | 20,000   | Int. EMEG             |
| Benzene   | 15  | 08/96   | 9           | 0.6  | CREG                  |
| Ethyl benzene   | 150   | 05/83   | 89          | 700  | MCL                   |
| Cumene(Isopropylbenzene)  | 59  | 12/00   | 45          |  |                       |
| Carbon Disulfide  | 250   | 07/95   | ND          | 1000   | Child RMEG            |
| Chloroethane  | 15.5  | 12/87   | ND          |  |                       |
| Chloromethane   | 5   | 05/88   | ND          |  |                       |
| Chlorotoluene, 2-   | 5   | 12/00   | ND          | 200  | Child RMEG            |
| Dichloroethane, 1, 1-   | 90  | 12/87   | 17          |  |                       |
| Dichloroethane, 1, 2-   | 7.9   | 5/82  | ND          | 5  | MCL                   |
| Dichloroethene, 1,2-  | 190   | 12/00   | 150         | 0.4  | CREG                  |
| Trichloroethane   | 285   | 05/83   | 8           |  |                       |
| <b>Trichloroethene</b>  | <b>2.4</b>  | 06/98   | ND          | 5  | MCL                   |
| Tetrahydrofuran   | 430   | 11/01   | 430         |  |                       |
| Vinyl chloride  | 6   | 07/84   | ND          | 0.03   | CREG                  |
| Methylene chloride  | 94  | 05/88   | ND          | 5  | MCL                   |
| <b>Methyl Ethyl Ketone</b>                                      | <b>13,000<sup>a</sup></b>   | 7/95  | ND          |  |                       |
| Methyl Isobutyl Ketone  | 48.5  | 03/89   | ND          |  |                       |
| Toluene   | 5,050   | 05/90   | 54          | 200  | Int. EMEG             |
| Xylenes   | 410   | 07/95   | 230         | 2000   | Int. EMEG             |
| <b><i>SVOCs</i></b>   | 9   | 11/96   | ND          |  |                       |
| <b>Cresol (Benzyl alcohol)</b>                                  | <b>2,800</b>  | 11/96   | ND          | 500  | Child RMEG            |
| <b>Butylbenzylphthalate</b>                                     | <b>2,800</b>  | 8/96  | 110         | 2000   | Child RMEG            |
| <b>Bis-(2-thylhexyl)phthalate</b>                               | <b>71,000</b>   | 8/96  | ND          | 3  | CREG                  |
| Di-n-octyl phthalate  | 3,000   | 6/97  | 52          | 4000   | Int. EMEG             |
| Naphthalene   | 95  | 11/01   | 20          | 6000   | Int. EMEG             |
| <b><i>TOTAL METALS</i></b>                                      |   |   |             |  |                       |
| <b>Arsenic</b>  | <b>20</b>   | 11/01   | 20          | 3  | Chronic EMEG<br>Child |
| Barium  | 500   | 11/01   | 500         | 700  | Child RMEG            |
| <b>Cadmium</b>  | <b>5.6</b>  | 4/87  | NA          | 2  | Chronic EMEG          |
| <b>Chromium</b>   | <b>233</b>  | 9/87  | NA          | 100  | MCL                   |
| Lead  | 214   | 9/87  | NA          | 15   | MCL                   |
| Iron  | 262,000   | 9/87  | NA          |  |                       |
| <b>Manganese</b>  | <b>17,000</b>   | 6/97  | NA          | 500  | Child RMEG            |
| Zinc  | 756   | 9/87  | NA          | 3000   | Chronic EMEG          |

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|                           |   |
|---------------------------|---|
| <b><i>Definitions</i></b> |   |
| ppb                       | parts per billion   |
| VOCs                      | Volatile Organic Compounds  |
| SVOCs                     | Semivolatile Organic Compounds  |
| ND                        | Non detect  |
| Int. EMEG                 | Inermediate Environmental Media Evaluation Guide  |
| CREG                      | Cancer Risk Evaluation Guide for $1 \times 10^{-6}$ excess cancer risk                    |
| MCL                       | Maximum Contaminant Level for drinking water (EPA)  |
| Child RMEG                | Child Reference Dose Media Evaluation Guide   |
| Chronic EMEG              | Chronic Environmental Media Evaluation Guide  |
| Blank                     | No HCV  |
| <b>Bolded Items</b>       | Contaminants of Concern   |
| a                         | Data is based on Phase I Pre-Design Studies Report by GEI Consultants Inc. October, 1995. |

**Table 2**

**Summary of Soil/Source Sample Analytical Results for  
Troy Mills Landfill December 2001**

| <b>Chemical</b>                    | <b>Sample<br/>Concentration<br/>(ppm)</b> | <b>Health Based<br/>Comparison Value<br/>(ppm)</b> | <b>Reference</b> |
|------------------------------------|---|--|------------------|
| <b><u>SVOCs</u></b>                |   |  |                  |
| <b>Bis(2-ethylhexyl) phthalate</b> | <b>250,000</b>                            | 0.6  | Chronic<br>EMEG  |
| <b>Di-n-octyl-phthalate</b>        | <b>12,000</b>                             | 4  | Int. EMEG        |
| <b><u>Inorganics</u></b>           |   |  |                  |
| <b>Chromium</b>                    | <b>4.4</b>                                | 0.1  | MCL              |

***Definitions***

|                     |   |
|---------------------|---|
| ppm                 | parts per million   |
| MCL                 | Maximum Contaminant Level for drinking water (EPA)  |
| SVOCs               | Semivolatile Organic Compounds  |
| Int. EMEG           | Intermediate Environmental Media Evaluation Guide (ATSDR)   |
| Chronic EMEG        | Chronic Environmental Media Evaluation Guide (ATSDR)  |
| <b>Bolded Items</b> | Contaminants of Concern   |
| LNAPL               | Light non-aqueous phase liquid, a product layer that is less dense than water and therefore floats on top of the water table. |

**Table 3**

**Summary of Surface Water Sample Analytical Results  
for Troy Mills Landfill December 2001**

| <b>Chemical</b>                    | <b>Maximum Detected Concentration (ppb)</b> | <b>Sample Location</b> | <b>Health Based Comparison Value (ppb)</b> | <b>Reference</b> |
|------------------------------------|---|------------------------|--|------------------|
| <b>VOCs</b>                        |   |                        |  |                  |
| <b>Cis-1, 2-dichloroethene</b>     | <b>200</b>                                  | SW-04                  | 70   | MCL              |
| <b>SVOCs</b>                       |   |                        |  |                  |
| <b>Di (2-ethylhexyl) phthalate</b> | <b>1,600</b>                                | SW-01                  | 3  | CREG             |
| <b>Inorganics</b>                  |   |                        |  |                  |
| Aluminum                           | 2,320                                       | SW-17                  | 20,000                                     | Int. EMEG        |
| Lead                               | 6.6   | SW-16                  | 15   | MCL              |
| <b>Manganese</b>                   | <b>17,000</b>                               | SW-03                  | 500  | Child RMEG       |

| <b><i>Definitions</i></b> |  |
|---------------------------|--|
| ppb                       | parts per billion  |
| VOCs                      | Volatile Organic Compounds   |
| SVOCs                     | Semivolatile Organic Compounds   |
| Inorganics                | Inorganics   |
| MCL                       | Maximum Contaminant Level for drinking water (EPA)   |
| CREG                      | Cancer Risk Evaluation Guide for $1 \times 10^{-6}$ excess cancer risk                       |
| Int. EMEG                 | Intermediate Environmental Media Evaluation Guide (ATSDR)                                    |
| RMEG                      | Reference Dose Media Evaluation Guide  |
| <b>Bolded Items</b>       | Contaminants of Concern  |
| J                         | Quantitation is approximate due to limitations identified during the quality control review. |



**Table 4**

**Summary of Sediment Samples Analytical Results  
for Troy Mills Landfill December 2001**

| <b>Chemical</b>             | <b>Maximum Detected Concentration (ppm)</b> | <b>Health Based Comparison Value (ppm)</b> | <b>Reference</b> |
|-----------------------------|---|--|------------------|
| <i>VOCs</i>                 |   |  |                  |
| Cis-1,2-Dichloroethene      | 0.2   | 600  | Int. EMEG        |
| Toluene                     | 0.02  | 10,000                                     | Int. EMEG        |
| <i>SVOCs</i>                |   |  |                  |
| Bis(2-ethylhexyl) Phthalate | 1.6   | 50   | CREG             |
| <i>INORGANICS</i>           |   |  |                  |
| Aluminum                    | 2.3   | 4000                                       | Int. EMEG        |
| Manganese                   | 17.1  | 3000                                       |                  |
| Zinc                        | .55   | 20,000                                     |                  |

| <b><i>Definitions</i></b> |  |
|---------------------------|--|
| ppm                       | Parts per million  |
| VOCs                      | Volatile Organic Compounds   |
| SVOCs                     | Semivolatile Organic Compounds   |
| Int. EMEG                 | Intermediate Environmental Media Evaluation Guide (ATSDR)              |
| Chronic EMEG              | Chronic Environmental Evaluation Guide (ATSDR)                         |
| CREG                      | Cancer Risk Evaluation Guide for $1 \times 10^{-6}$ excess cancer risk |
| <b>Bolded Items</b>       | Contaminants of Concern  |

**Table 5**  
**Summary of Sediment Sample Analytical Results for**  
**Sand Dam Pond October 2001**

| <b>Chemical</b>     | <b>Maximum<br/>Detected<br/>Concentration<br/>(ppm)</b> | <b>Sample<br/>Location</b> | <b>Health<br/>based<br/>Comparison<br/>Value<br/>(ppm)</b> | <b>Reference</b>      |
|---------------------|---|----------------------------|--|-----------------------|
| <b>Total Metals</b> |   |                            |  |                       |
| chromium            | 16  | DES-SED #3                 | 80,000   | Child RMEG            |
| lead                | 42  | DES-SED #3                 | 400  | EPA- Soil<br>Guidance |
|                     |   |                            |  |                       |
|                     |   |                            |  |                       |
|                     |   |                            |  |                       |
|                     |   |                            |  |                       |

| <b><i>Definitions</i></b> |   |
|---------------------------|---|
| ppm                       | Parts per million   |
| Child RMEG                | Child Reference Dose Media Evaluation Guide   |
| EPA- Soil Guidance        | EPA Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities |

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**APPENDIX C**

***ATSDR Plain Language Glossary of Environmental Health Terms***

|                               |   |
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| <b>Absorption:</b>            | How a chemical enters a person's blood after the chemical has been swallowed, has come into contact with the skin, or has been breathed in.   |
| <b>Acute Exposure:</b>        | Contact with a chemical that happens once or only for a limited period of time. ATSDR defines acute exposures as those that might last up to 14 days.   |
| <b>Additive Effect:</b>       | A response to a chemical mixture, or combination of substances, that might be expected if the known effects of individual chemicals, seen at specific doses, were added together.   |
| <b>Adverse Health Effect:</b> | A change in body function or the structures of cells that can lead to disease or health problems.   |
| <b>Antagonistic Effect:</b>   | A response to a mixture of chemicals or combination of substances that is <b>less</b> than might be expected if the known effects of individual chemicals, seen at specific doses, were added together.   |
| <b>ATSDR:</b>                 | The <b>A</b> gency for <b>T</b> oxic <b>S</b> ubstances and <b>D</b> isease <b>R</b> egistry. ATSDR is a federal health agency in Atlanta, Georgia that deals with hazardous substance and waste site issues. ATSDR gives people information about harmful chemicals in their environment and tells people how to protect themselves from coming into contact with chemicals. |
| <b>Aquifer</b>                | An underground formation of permeable rock or loose material, which can produce useful quantities of water when tapped by a well.   |
| <b>Background Level:</b>      | An average or expected amount of a chemical in a specific environment. Or, amounts of chemicals that occur naturally in a specific-environment.   |
| <b>Biota:</b>                 | Used in public health, things that humans would eat – including animals, fish and plants.   |
| <b>Cancer:</b>                | A group of diseases which occur when cells in the body become abnormal and grow, or multiply, out of control  |
| <b>Carcinogen:</b>            | Any substance shown to cause tumors or cancer in experimental studies.  |

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| <b>CERCLA:</b>   | See <b>Comprehensive Environmental Response, Compensation, and Liability Act</b> .  |
| <b>Chronic Exposure:</b>   | A contact with a substance or chemical that happens over a long period of time. ATSDR considers exposures of more than one year to be <i>chronic</i> .  |
| <b>Completed Exposure Pathway:</b>   | See <b>Exposure Pathway</b> .   |
| <b>Comparison Value: (CVs)</b>   | Concentrations or the amount of substances in air, water, food, and soil that are unlikely, upon exposure, to cause adverse health effects. Comparison values are used by health assessors to select which substances and environmental media (air, water, food and soil) need additional evaluation while health concerns or effects are investigated. |
| <b>Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):</b> | <b>CERCLA</b> was put into place in 1980. It is also known as <b>Superfund</b> . This act concerns releases of hazardous substances into the environment, and the cleanup of these substances and hazardous waste sites. ATSDR was created by this act and is responsible for looking into the health issues related to hazardous waste sites.          |
| <b>Concern:</b>  | A belief or worry that chemicals in the environment might cause harm to people.   |
| <b>Concentration:</b>  | How much or the amount of a substance present in a certain amount of soil, water, air, or food.   |
| <b>Contaminant:</b>  | See <b>Environmental Contaminant</b> .  |
| <b>Delayed Health Effect:</b>  | A disease or injury that happens as a result of exposures that may have occurred far in the past.   |
| <b>Dermal Contact:</b>   | A chemical getting onto your skin. (see <b>Route of Exposure</b> ).   |
| <b>Dose:</b>   | The amount of a substance to which a person may be exposed, usually on a daily basis. Dose is often explained as “amount of substance(s) per body weight per day”.  |
| <b>Dose / Response:</b>  | The relationship between the amount of exposure (dose) and the change in body function or health that result.   |
| <b>Duration:</b>   | The amount of time (days, months, years) that a person is exposed to a chemical.  |
| <b>Environmental Contaminant:</b>  | A substance (chemical) that gets into a system (person, animal, or the environment) in amounts higher than that found in <b>Background Level</b> , or what would be expected.   |

**Environmental  
Media:**

Usually refers to the air, water, and soil in which chemicals of interest are found. Sometimes refers to the plants and animals that are eaten by humans. **Environmental Media** is the second part of an **Exposure Pathway**.

**U.S. Environmental  
Protection Agency (EPA):**

The federal agency that develops and enforces environmental laws to protect the environment and the public's health.

**Epidemiology:**

The study of the different factors that determine how often, in how many people, and in which people will disease occur.

**Exposure:**

Coming into contact with a chemical substance. (For the three ways people can come in contact with substances, see **Route of Exposure**.)

**Exposure Assessment:**

The process of finding the ways people come in contact with chemicals, how often and how long they come in contact with chemicals, and the amounts of chemicals with which they come in contact.

**Exposure Pathway:**

A description of the way that a chemical moves from its source (where it began) to where and how people can come into contact with (or get exposed to) the chemical.

ATSDR defines an exposure pathway as having 5 parts:

1. Source of Contamination,
2. Environmental Media and Transport Mechanism,
3. Point of Exposure,
4. Route of Exposure, and
5. Receptor Population.

When all 5 parts of an exposure pathway are present, it is called a **Completed Exposure Pathway**. Each of these 5 terms is defined in this Glossary.

**Frequency:**

How often a person is exposed to a chemical over time; for example, every day, once a week, twice a month.

**Groundwater**

Is water that exists in the pore spaces in soil and fractures in rock and sediment beneath the Earth's surface. It originates as rainfall or snow, and then moves through the soil into the groundwater system, where it eventually makes its way back to surface streams, lakes, or ocean.

**Hazardous Waste:**

Substances that have been released or thrown away into the environment and, under certain conditions, could be harmful to people who come into contact with them.

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| <b>Health Effect:</b>                      | ATSDR deals only with <b>Adverse Health Effects</b> (see definition in this Glossary).   |
| <b>Indeterminate Public Health Hazard:</b> | The category is used in Public Health Assessment documents for sites where important information is lacking (missing or has not yet been gathered) about site-related chemical exposures.  |
| <b>Ingestion:</b>                          | Swallowing something, as in eating or drinking. It is a way a chemical can enter your body (See <b>Route of Exposure</b> ).  |
| <b>Inhalation:</b>                         | Breathing. It is a way a chemical can enter your body (See <b>Route of Exposure</b> ).   |
| <b>LOAEL:</b>                              | <b>Lowest Observed Adverse Effect Level.</b> The lowest dose of a chemical in a study, or group of studies, that has caused harmful health effects in people or animals.   |
| <b>Malignancy:</b>                         | See <b>Cancer</b> .  |
| <b>MRL:</b>                                | <b>Minimal Risk Level.</b> An estimate of daily human exposure – by a specified route and length of time -- to a dose of chemical that is likely to be without a measurable risk of adverse, noncancerous effects. An MRL should not be used as a predictor of adverse health effects.   |
| <b>NPL:</b>                                | The <b>National Priorities List.</b> (Which is part of <b>Superfund</b> .) A list kept by the U.S. Environmental Protection Agency (EPA) of the most serious, uncontrolled or abandoned hazardous waste sites in the country. An NPL site needs to be cleaned up or is being looked at to see if people can be exposed to chemicals from the site. |
| <b>NOAEL:</b>                              | <b>No Observed Adverse Effect Level.</b> The highest dose of a chemical in a study, or group of studies, that did not cause harmful health effects in people or animals.   |
| <b>No Apparent Public Health Hazard:</b>   | The category is used in ATSDR's Public Health Assessment documents for sites where exposure to site-related chemicals may have occurred in the past or is still occurring but the exposures are not at levels expected to cause adverse health effects.  |
| <b>No Public Health Hazard:</b>            | The category is used in ATSDR's Public Health Assessment documents for sites where there is evidence of an absence of exposure to site-related chemicals.  |
| <b>PHA:</b>                                | <b>Public Health Assessment.</b> A report or document that looks at chemicals at a hazardous waste site and tells if people could be harmed from coming into contact with those chemicals. The PHA also tells if possible further public health actions are needed.  |

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| <b>Plume:</b>                       | A line or column of air or water containing chemicals moving from the source to areas further away. A plume can be a column or clouds of smoke from a chimney or contaminated underground water sources or contaminated surface water (such as lakes, ponds and streams).   |
| <b>Point of Exposure:</b>           | The place where someone can come into contact with a contaminated environmental medium (air, water, food or soil). For examples: the area of a playground that has contaminated dirt, a contaminated spring used for drinking water, the location where fruits or vegetables are grown in contaminated soil, or the backyard area where someone might breathe contaminated air.   |
| <b>Population:</b>                  | A group of people living in a certain area; or the number of people in a certain area.  |
| <b>PRP:</b>                         | <b>Potentially Responsible Party.</b> A company, government or person that is responsible for causing the pollution at a hazardous waste site. PRP's are expected to help pay for the clean up of a site.   |
| <b>Public Health Assessment(s):</b> | See <b>PHA</b> .  |
| <b>Public Health Hazard:</b>        | <p>The category is used in PHAs for sites that have certain physical features or evidence of chronic, site-related chemical exposure that could result in adverse health effects.</p> <p>PHA categories given to a site which tell whether people could be harmed by conditions present at the site. Each are defined in the Glossary. The categories are:</p> <ul style="list-style-type: none"><li>- Urgent Public Health Hazard</li><li>- Public Health Hazard</li><li>- Indeterminate Public Health Hazard</li><li>- No Apparent Public Health Hazard</li><li>- No Public Health Hazard</li></ul> |
| <b>Receptor Population:</b>         | People who live or work in the path of one or more chemicals, and who could come into contact with them (See <b>Exposure Pathway</b> ).   |
| <b>Reference Dose (RfD):</b>        | An estimate, with safety factors (see <b>safety factor</b> ) built in, of the daily, life-time exposure of human populations to a possible hazard that is <u>not</u> likely to cause harm to the person.  |

**Route of Exposure:**

The way a chemical can get into a person's body. There are three exposure routes:

- breathing (also called inhalation),
- eating or drinking (also called ingestion), and
- or getting something on the skin (also called dermal contact).

**Safety Factor:**

Also called **Uncertainty Factor**. When scientists don't have enough information to decide if an exposure will cause harm to people, they use "safety factors" and formulas in place of the information that is not known. These factors and formulas can help determine the amount of a chemical that is not likely to cause harm to people.

**Sample Size:**

The number of people that are needed for a health study.

**Sample:**

A small number of people chosen from a larger population (See **Population**).

**Source (of Contamination):**

The place where a chemical comes from, such as a landfill, pond, creek, incinerator, tank, or drum. Contaminant source is the first part of an **Exposure Pathway**.

**Special Populations:**

People who may be more sensitive to chemical exposures because of certain factors such as age, a disease they already have, occupation, sex, or certain behaviors (like cigarette smoking). Children, pregnant women, and older people are often considered special populations.

**Statistics:**

A branch of the math process of collecting, looking at, and summarizing data or information.

**Superfund Site:**

See **NPL**.

**Survey:**

A way to collect information or data from a group of people (**population**). Surveys can be done by phone, mail, or in person. ATSDR cannot do surveys of more than nine people without approval from the U.S. Department of Health and Human Services.

**Synergistic effect:**

A health effect from an exposure to more than one chemical, where one of the chemicals worsens the effect of another chemical. The combined effect of the chemicals acting together are greater than the effects of the chemicals acting by themselves.

**Toxic:**

Harmful. Any substance or chemical can be toxic at a certain dose (amount). The dose is what determines the potential harm of a chemical and whether it would cause someone to get sick.



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| <b>Toxicology:</b>                  | The study of the harmful effects of chemicals on humans or animals.  |
| <b>Tumor:</b>                       | Abnormal growth of tissue or cells that have formed a lump or mass.  |
| <b>Uncertainty Factor:</b>          | See <b>Safety Factor</b> .   |
| <b>Urgent Public Health Hazard:</b> | This category is used in ATSDR's Public Health Assessment documents for sites that have certain physical features or evidence of short-term (less than 1 year), site-related chemical exposure that could result in adverse health effects and require quick intervention to stop people from being exposed. |
| <b>Water Table</b>                  | The surface below which all openings in the soil and rock are filled with water (the top of the saturated zone) is the water table.  |

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**APPENDIX D**

**Description of Health Comparison Values**

Health assessors use health comparison values to help decide whether compounds may need further evaluation. Health comparison values are derived using information on the toxicity of the chemical and assuming frequent opportunities for exposure (e.g., a residential setting) to the contaminated media (e.g., in this instance TML). For non-cancer toxicity, DHHS typically uses Minimal Risk Levels from the Agency for Toxic Substances and Disease Registry (ATSDR) or Reference Doses from the Environmental Protection Agency (EPA), which are estimates of daily human exposure to a contaminant that are unlikely to cause adverse non-cancer health effects over a lifetime. Cancer risk comparison values are based on EPA's chemical-specific cancer slope factors and an estimated excess lifetime cancer risk of one in one million. Therefore, if the concentration of a chemical is less than its comparison value, it is unlikely that exposure would result in adverse health effects, and further evaluation of exposures to that chemical is not warranted. If the concentration of a chemical exceeds a comparison value, adverse health effects from exposure are not necessarily expected, but potential exposures to that chemical at the site should be further evaluated.

Specific types of health comparisons are described below in order of preference for ATSDR Public Health Assessments or Health Consultations.

**Health Comparison Values Derived by ATSDR**

- Environmental Media Evaluation Guide (EMEG)
- Reference Dose Media Evaluation Guide (RMEG)
- Cancer Risk Evaluation Guide (CREG)

EMEG and RMEG values are used to evaluate the potential for non-cancer health effects. CREG values provide information on the potential for carcinogenic effects. EMEG values are derived for different durations of exposure. Acute EMEGs correspond to exposures lasting less than 14 days. Intermediate EMEGs correspond to exposures lasting between 14 days and 1 year. Chronic EMEGs correspond to exposures lasting longer than 1 year. CREG and RMEG values are derived assuming a lifetime duration of exposure. All of these comparison values are derived assuming opportunities for exposure in a residential setting.

**Health Comparison Values Derived by EPA**

- Risk-Based Concentrations (RBC) for air, water, soil, and food
- Lifetime Health Advisory (LTHA) for drinking water

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The Superfund Technical Support Section in EPA Region III derives Risk-Based Concentrations values using available toxicological information and assuming frequent residential exposures to the contaminated media. A Lifetime Health Advisory is the concentration of a chemical in drinking water that is not expected to cause any adverse non-carcinogenic effects over a lifetime of exposure.

### Environmental Regulatory Standards

- Maximum Contaminant Level (MCL) for drinking water
- Maximum Contaminant Level Goal (MCLG) for drinking water
- Ambient Groundwater Quality Standards (AGQS)
- Method 1 Soil Standards (S-1)

A Maximum Contaminant Level Goal is a non-enforceable health goal from EPA that is set at a level at which no known or anticipated adverse effect on the health of persons occur and which allows an adequate margin of safety. A Maximum Contaminant Level is the highest level of a contaminant that is allowed in drinking water, and is an enforceable standard. MCLs are set as close to the MCLG as feasible using the best available treatment technology and taking cost into consideration. Ambient Groundwater Quality Standards and Soil S-1 Standards are regulatory standards for groundwater and soil, respectively, from the New Hampshire Department of Environmental Services (see DES' Administrative Rule Env-Wm 1403 and DES' Risk Characterization and Management Policy, respectively).

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Troy Mills Landfill  
Troy, Cheshire County, New Hampshire**

**APPENDIX E**

**Needs Assessment Survey Questionnaire**

**Educational Needs Assessment for  
the Troy Mills Landfill Site,  
Troy, New Hampshire**

**February 2004**

**Vickie A. Shallow, Health Promotion Advisor  
New Hampshire Department of Health and Human Services  
Office of Community and Public Health  
Bureau of Environmental Occupational Health**

## **INTRODUCTION**

The New Hampshire Department of Health and Human Services (DHHS) Bureau of Environmental and Occupational Health (BEOH) is currently conducting a Public Health Assessment on the Troy Mills Landfill National Priority Listing Site in Troy, New Hampshire, under its cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). This needs assessment was undertaken as part of the planning process to develop a health education program for residents living in around the area of the Troy Mills Landfill. The goal was to document and respond accordingly to: community interest in the Site, community knowledge about the Site, community health concerns in relation to the Site, preferred sources of information regarding the Site, and residents' need for further information.

### **A. SCHEDULED RELEASE OF PHA**

The Initial Release of the Public Health Assessment was prepared on April 27, 2004. The final version of the Public Health Assessment should be available by the end of summer 2004.

### **B. ONGOING ACTIVITIES**

In addition to this Needs Assessment Survey for the Public Health Assessment, a Health Assessor is currently reviewing environmental data taken from the landfill site and surrounding area.

### **C. METHODS/COMMUNITY OUTREACH PLAN**

A needs assessment survey (Appendix A) was developed and distributed via post office to 1000 households in the town of Troy and to 10 Fitzwilliam households living along the borders of the Troy Mills Landfill Site.

On November 6, 2003, DHHS distributed 1010 surveys to residents of Troy and Fitzwilliam using bulk mail service through the local post office. Approval and assistance with this project was gained from a concerned citizen Ralph Wentworth. To insure the return of the

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surveys 2-drop boxes were strategically placed where residents could access them easily. One at the town's Tax Collector office and at the second was placed at the Public Library. The 10 Fitzwilliam households that received surveys also received postage paid envelopes with the survey to ease the return of their replies. Twenty (20%) of the Fitzwilliam residents responded to the survey. To be informative enclosed with each survey were (1) information on who is conducting the survey, (2) an explanation of the purpose of the survey, and (3) an explanation of the process of conducting a health assessment using the information provided in the survey. Letters to the Troy Town News communicated the intent of the survey, the start date, the ending date, and the status of information gathered and any updates of the information that would be forthcoming.

All completed surveys were returned to DHHS, by drop box or mail by December 6, 2003. Notices in the local Troy Town News were posted to remind residents about the survey, its purpose, and the date that it should be returned to the drop boxes. The survey results were compiled and have been incorporated into this Educational Needs Assessment. A detailed summary of responses is attached as Appendix B.

Along with the Educational Needs Assessment survey, residents' concerns and questions were also collected through a Public Availability Session that was held on September 23, 2003. Press releases were sent to the Keene Sentinel and the Troy Town News announcing the time, date, and purpose of the Public Availability Session. A total of 10 residents attended this session representing (1%) of the total households for this area. This low participation rate could be contributed to limited interest in the safety of the site and limited resources to communicate the meeting time. Prior to this meeting there had been several meetings about the Troy Landfill Site, our meeting might have been more successful if it was held in conjunction with one of the previous meeting held by DES and the town officials. It is possible that residents did not identify

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this meeting as important due to the fact that several meeting had already been held. DHHS representatives were present at the Public Availability Session to educate the community on the Public Health Assessment process and recorded community health concerns for incorporation into the health assessment document. Due to the fact that residents' concerns shared during the Public Availability Session are considered confidential, all comments have been paraphrased to protect the identity of the resident.

Another source of community concerns was the needs assessment survey of which a total of 34 were received by the due date of December 6, 2003.

**D. KEY FINDINGS**

1. The majority of the survey respondents (97%) expressed an interest in the Troy Mills Landfill Site.
2. Currently, most residents receive site information through newspapers, mail, and community meetings.
3. Most residents would prefer to receive site information through the mail and the local newspaper.
4. Nearly all of the survey respondents expressed a desire for information on contaminants found on-site, health effects and the routes of exposure.
5. Almost all respondents are concerned about water quality issues in their neighborhood and future risk to the water table due to this site.
6. Eighty percent (79.4%) of the respondents are "very interested" in the site.
7. Over half of the residents (58.8%) have lived in their homes over 10 years.
8. Several families have young children under the age of six years.

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9. Forty-three percent of the respondents are “unsure” if the Troy Mills Landfill Site possesses a risk to their health.
10. Over one-half of the respondents feel recreational activities near the Site are putting them at risk.
11. Respondents were mainly concerned with:
  - \* The health effects of exposure to Site contaminants for themselves and their families.
  - \* Question of water supplies being contaminated ranging from ground water, water table, and the aquifer.
  - \* Any long-term health effects that may exist.

## **E. DISCUSSION**

A Public Health Assessment (PHA) focuses on identifying and evaluating any public health impact from contaminants released from a hazardous waste Site, or some type of environmental release event and provides information to the community about health risks and effects posed by contact with Site contaminants. A PHA typically consists of three main components:

1. A review of available environmental data;
2. A compilation and response to community concerns;
3. A review of health outcome data, when applicable.

The Educational Needs Assessment is a tool that will help focus the second component of the PHA. Health Assessors use the information gathered during a needs assessment to address a community's concerns, and to answer questions in the PHA document.

There was a lower than expected return rate (3.5%) on this mail-in survey. This indicates that residents are not interested in this site or any health risks that it may pose for themselves and



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the community, or are uninformed about the site. The lack of response could be due to the fact that the drop boxes were not ideally located for residents. Due to budget constraints postage paid services were not feasible. In the future it recommended that a small token of appreciation or incentive be included with a mailing to support the return of the surveys.

Over half (58.8%) of survey respondents have lived in their homes over 10 years. Although less a quarter (17.1 %) had children under the age of six years currently living there, length of residency responses indicate a high likelihood that many children have grown up in this area and the surrounding area of the Troy Mills Landfill Site.

### **Residents' Attitudes**

Respondents were asked many questions regarding their attitudes about the Site. Specifically residents were asked, "What is your general feeling about the Site?" 31.4% of respondents felt "it does affect their health", while 42.8% were "unsure" if it affected their health. The number of respondents answering "unsure" suggests that respondents do not have enough information about the site to make an educated response. This indicates that there is still a need for health education on the chemicals found at the site and any health risk that may exist for residents. When respondents were asked their level of interest in the Site, 79.4% of respondents indicated they were "very interested," while 17.6% indicated they were "somewhat interested." This indicates that respondents want to know about this site and any health risks that may exist. It also indicates that respondents want feedback and follow up on the site, so that they can be aware of any possible health risks.

### **Residents' Knowledge**

Respondents were asked many questions to gage their knowledge pertaining to the Site; specifically, "How did you hear about the chemicals?" "What health impacts or effects have you

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heard about?” and “How did you hear about these impacts or effects?”. The responses ranged from having no idea, to identifying a specific area and acreage affected. Some indicated that the chemicals are to be capped off and contained. The chemicals dumped were to make vinyls. The knowledge of how many barrels located on site ranged from 1,000 to 10,000 barrels. Individuals mentioned several chemicals that were present here including PCB's, trace minerals, benzene, MER, solvents (varsols), plasticizers, vinyl chloride, and plastic organic solvents. Only four respondents were able to correctly identify chemicals currently found at the site, this indicates that there needs to be a better education and communication describing the chemicals found on site and what health effects they might impose.

The most common concern mentioned was with the contamination of water, especially with Rockwood Brook and Sand Dam Pond, run off water from the Troy Mill Landfill Site and how it will affect groundwater, the water table, (aquifer) and nearby wells. The clarification of these environmental media need to be defined especially since the terms ground water, aquifer, and water table were used in many different contexts.

The most common physical hazards identified at the Troy Mills Landfill Site were leaking, half buried barrels, a bluish tint in ground water, exposed carpet and vinyl scraps, and broken glass found along the Rockwood Brook.

Several residents (29.4%) were interested in having their family physicians informed about any potential health problems linked to previously disposed chemical found at the Troy Mills Landfill site

### **Associated Health Risks**

Needs assessment recipients were asked “What recreational activities near the Site do you feel are putting you at risk?” Over half (59.4%) indicated that they use trails on and around the

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Site. Some indicated walking and hiking on the trails while others stated the use of ATV's, snowmobiles, and dirt bikes. Another concern that respondents have is with recreational activities that take place in Rockwood Brook and more specifically at Sand Dam Pond. Many mentioned concerns with swimming at this site along with canoeing and fishing.

At the end of the survey, respondents were given an opportunity to ask health-related questions or to add their main concerns regarding the Troy Mills Landfill Site. The need assessment survey responses have been retained by the Bureau of Environmental and Occupational Health. For the purpose of the summary the questions have been paraphrased to protect the respondents' identity and to maintain confidentiality and to insure that the questions could be included and addressed in the Public Health Assessment.

### **Sources of Information**

Ninety four percent of the time respondents (94.1%) prefer to receive news about their local community by mail. The commonly read papers include the Keene Sentinel, the Troy Town News. Other methods identified to receive information include community meeting, email, telephone and cable in order of preference.

### **Summary of Community Concerns**

The following is a list of questions that was compiled using the written survey and public availability session.

#### **Health Concerns**

##### *CANCER AND RESPIRATORY ILLNESS:*

1. Does the town of Troy have higher respiratory disease rates than other towns?
2. Are there more cases of cancer in Troy than other surrounding towns?

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*CHILDREN AND FAMILIES:*

1. Is it safe for my children to swim in Sand Dam pond?

*GENERAL HEALTH QUESTIONS:*

1. Are the chemicals on the site dangerous?
2. What health risks are associated with the chemicals found at the landfill?
3. How can I avoid these health risks?
4. How are the chemicals being disposed of, what is happening to them?

**Nature of Contamination**

1. What will happen to people that were exposed to these chemicals in the past?

**Extent of Contamination**

1. What are the effects of the chemicals on the water quality in wells, the public water supply and Sand Dam Pond?

**Future Exposures**

1. Will these chemicals have a long -term effect on our health?
2. Is there any future risk that exists for our water supply?
3. How will the water to the south branch of the Ashuelot Fishery be affected?

**Testing**

1. Is there any test that can measure if a person has been exposed?
2. What kinds of test are being done to identify if there are any concerns?

**Other**

1. Please keep us informed.
2. How can we maintain a successful summer recreation program is the Sand Dam Pond safe for such activities?

**Conclusions from Health Promotion Advisor**

- More education on the chemicals present at the site, and the health concerns related to these chemicals needs to be presented to the residents of Troy Mills.
- The local papers including the Troy News and the Keene Sentinel are the most effective way to alert residents about this information on the Troy Mills Landfill site.

**Recommendations from Health Promotion Advisor**

- A fence should be placed around the perimeter of the property especially the 1-acre area where the exposed barrels run off water is found.
- Signs should be posted around the perimeter to keep foot traffic and all terrain vehicles off the affected area of the site.
- A clear explanation of the status of the site and the chemicals that are on the site along with any health risk should be communicated to the community via the Keene Sentinel and the Troy News Letter.
- A definition of what a water table, aquifer and water table should be defined in the public health assessment.
- In the education meeting and in the fact sheets offered to citizens. It should be clearly stated that the Troy Mills Landfill site is private property and therefore any crossing is considered to be trespassing.



## Community Needs Assessment Site: Troy Mills Troy, NH

The Bureau of Environmental & Occupational Health is asking residents, and former residents, who live near the Troy Mills Site to complete this form. This will help us identify any health concerns you may have. Please limit your questions about the Site to human health topics. For example, we are not able to address issues such as property values or effects on pets.

This survey is strictly **CONFIDENTIAL**. The data will be gathered in a report and no names or personal information will be used.

**THANK YOU** for taking the time to complete this survey so that we may better serve you in

If you are interested in being on our mailing list, please provide your name and address below.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: (home) \_\_\_\_\_ (work) \_\_\_\_\_

Email: \_\_\_\_\_

1. How long have you lived at this address? \_\_\_\_\_ (years) \_\_\_\_\_ (months) \_\_\_\_\_

2. Is this a seasonal home? ☐ Yes ☐ No

If yes, how many months do you stay each year? \_\_\_\_\_

3. Do you have children 6 years old or younger who live with you? Yes No

4. How would you like to receive news about the Troy Mills Site?

(Check all that apply.)

☐ Telephone (If yes, what time is best?) \_\_\_\_\_ AM or PM

☐ Mail

☐ Newspapers (which one(s)? \_\_\_\_\_, \_\_\_\_\_)

☐ Cable/TV

☐ Community meeting

☐ Other \_\_\_\_\_

- 5. To help us determine what you may already know about the Site, please tell us what you have heard about the chemicals that have been found at this Site.**
- 

**5B. How did you hear about the chemicals?**

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**5C. What health impacts or effects have you heard about?**

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**5D. How did you hear about these impacts or effects?**

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**6. Do you or does anyone in your home....**

|  |                              |                             |
|--|------------------------------|-----------------------------|
| Walk or play on the Troy Mills Site property           | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Walk or play in the woods or on trails around the Site | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Play or wade in the Rockwood Brook                     | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Play, wade or swim in Sand Dam Pond                    | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Eat fish from Rockwood Brook                           | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Eat fish from Sand Dam Pond                            | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Use the brook or pond for other purposes               | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

Describe: \_\_\_\_\_

**7. Have you seen any thing near or on the Troy Mills Site that could cause you harm? (E.g. fence children can climb, chemical spills, unsafe buildings, etc.)**

☐ No

☐ Yes If yes, please  
describe: \_\_\_\_\_

---

**8. Do you feel outdoors activities near the Site are putting you at risk? (E.g. swimming, gardening, fishing, using recreational vehicles)**

☐ No

☐ Yes If yes, please describe the  
activities: \_\_\_\_\_

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**9. Have you smelled odors coming from the Site?**

- ☐ No
- ☐ Yes     If yes, please describe the odor and when it occurs:

---

**10. What is your general feeling about this Site? (Please check one.)**

- ☐ It does not affect my health.
- ☐ It does affect my health.
- ☐ I am not sure.

**11. What is your level of interest in this Site? (Please check one.)**

- ☐ Very interested
- ☐ Somewhat interested
- ☐ Not interested

**12. Do you have any other health-related questions or concerns about the Troy Mills Site that you would like us to discuss in the Public Health Assessment?**

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The Department of Health & Human Services can provide physicians with information about the potential health problems linked to previously dispose of chemicals at the Site. Would you like your physician to be added to our mailing list?

Physician Name \_\_\_\_\_

Address \_\_\_\_\_

Telephone: \_\_\_\_\_

**Completed surveys can be placed in secured drop boxes located at the Troy Town Hall or Library. Thank you for your participation. We will keep you updated on any new information.**

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Keep this portion for your information should you require additional information.  
Thank you again for taking the time to complete this survey. Please feel free to call us at **(603) 271-3994** or toll free in NH at (800) 852-3345 extension 3994. You may also write to us at:

NHDPHHS, Bureau of Environmental and Occupational Health

29 Hazen Drive

Concord, NH 03301

Fax: (603) 271-3991

*Vickie A. Shallow*

Health Promotion Advisor

**Email: [vshallow@dhhs.state.nh.us](mailto:vshallow@dhhs.state.nh.us)**

## **APPENDIX B**

### **DETAILED FINDINGS OF THE COMMUNITY EDUCATIONAL NEEDS ASSESSMENT** **TROY MILLS, TROY, NEW HAMPSHIRE**

#### **Public Availability Sessions**

| <b>Day</b> | <b>Date</b>        | <b>Time</b> | <b># of Attendees</b> |
|------------|--------------------|-------------|-----------------------|
| Tuesday    | September 23, 2003 | 6-8pm       | <b>10</b>             |

#### **Survey Response Rate**

|                     |             |
|---------------------|-------------|
| Surveys Distributed | 1010        |
| Surveys Returned    | 34          |
| <b>Return Rate</b>  | <b>3.4%</b> |

#### **Demographic Information**

##### **Question 1. How long have you lived at this address?**

| <b>Length of Residency</b> | <b>Responses</b> | <b>%</b>    |
|----------------------------|------------------|-------------|
| Less than 5 years          | 4                | 11.7        |
| 5-10 years                 | 10               | 29.4        |
| 11-20 years                | 8                | 23.5        |
| 21-30 years                | 5                | 14.7        |
| 31 -40 years               | 5                | 14.7        |
| 41-50 years                | 1                | 2.9         |
| 50 + years                 | 0                | 0           |
| No response                | 1                | 2.9         |
| <b>Total</b>               | <b>34</b>        | <b>99.8</b> |

(0-10 years: 41.1 %; 11+ years 58.8 %.)

##### **Question 2. Is this a seasonal home?**

| <b>Responses</b> | <b>#</b>  | <b>%</b>   |
|------------------|-----------|------------|
| Seasonal         | 0         | 0          |
| Year Round       | 33        | 97.1       |
| No response      | 1         | 2.9        |
| <b>Total</b>     | <b>34</b> | <b>100</b> |

##### **Question 3. Do you have children 6 years old or younger living with you?**

| <b>Responses</b>                       | <b>#</b>  | <b>%</b>   |
|--|-----------|------------|
| Families with Children Age 6 and Under | 7         | 20.6       |
| No children                            | 27        | 79.4       |
| <b>Total</b>                           | <b>34</b> | <b>100</b> |

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**Question 4. How would you like to receive information about the Troy Mills Site?**

| <b>Responses</b>  | <b>#</b> | <b>%</b> |
|-------------------|----------|----------|
| Telephone         | 4        | 8.5      |
| Mail              | 32       | 94.1     |
| Newspapers        | 14       | 41.1     |
| Cable / TV        | 1        | .03      |
| Community Meeting | 8        | 23.5     |

Newspapers: Keene Sentinel, Troy Town News , and Monadnock Shopper

**Question 5. To help us determine what you already know about the Site, please tell us what you have heard about the chemicals that have been found at this Site?**

|  |
|--|
| Chemicals are contained in a 1 acre area   |
| Area will be capped off and contained  |
| The chemicals are carcinogenic   |
| Chemicals used to make vinyls  |
| Lots of barrels on Site anywhere from 1,000-10,000   |
| Barrels containing chemicals are leaking or have leaked already                                |
| Chemicals consist of PCB's, Trace Minerals, Toxic chemicals, Benzene, and MER                  |
| Possible contamination of Sand Dam Pond  |
| People in area have brain tumors because of chemicals  |
| Chemicals may enter into the water table   |
| Chemicals found consist of varsols, plasticizers, vinyl chloride, and plastic organic solvents |
| Chemicals leaking into soil  |
| MEC, PVC   |
| All of the chemicals found cause disease   |
| We've been told the area has been tested and it is safe, is it?                                |
| The chemicals are toxic, will spread and travel, doesn't evaporate, long lasting               |

**Question 5B. How did you hear about the chemicals?**

|   |    |
|---|----|
| Newspapers (Keene Sentinel, Troy Town News) | 18 |
| Word of mouth                               | 6  |
| Town Officials (Public Meetings)            | 5  |
| Past employee                               | 4  |
| EPA briefing                                | 3  |
| Seen it                                     | 2  |
| Original study                              | 1  |

**Question 5C. What health impacts or effect have you heard about?**

|   |    |
|---|----|
| None given  | 9  |
| Cancer (brain tumors, dysplasia)                          | 5  |
| None on humans (what about the animals?, no native fish!) | 3  |
| Psychological, mental                                     | 1  |
| Filters on wells because of it                            | 1  |
| All   | 65 |
| No response   | 9  |

**Question 5D. How did you hear about these impacts or effects?**

|   |
|---|
| Chemicals are contained in a 1 acre area                                      |
| Area will be capped off and contained   |
| The chemicals are carcinogenic  |
| Chemicals used to make vinyls   |
| Lots of barrels on Site anywhere from 1,000-10,000                            |
| Barrels containing chemicals are leaking or have leaked already               |
| Chemicals consist of PCB's, Trace Minerals, Toxic chemicals, Benzene, and MER |

**Question 6. Do you or any children in your home?**

| <b>Responses</b>  | <b>#</b> | <b>%</b> |
|---|----------|----------|
| Walk or play on the Troy Mills Site property?           | 8        | 23.5     |
| Walk or play in the woods or on trails around the Site? | 18       | 52.9     |
| Play or wade in the Rockwood Brook?                     | 6        | 17.6     |
| Play, wade or swim in the Sand Dam Pond?                | 15       | 44.1     |
| Eat fish from Rockwood Brook?                           | 6        | 17.6     |
| Eat fish from Sand Dam Pond?                            | 4        | 11.8     |
| Use the brook or pond for other purposes?               | 8        | 23.5     |

**Question 7. Have you seen anything near or on the Troy Mills Site that could cause you harm?**

| <b>Response</b> | <b>#</b>  | <b>%</b>   |
|-----------------|-----------|------------|
| Yes             | 9         | 26.5       |
| No              | 22        | 64.7       |
| No Response     | 3         | 8.8        |
| <b>Total</b>    | <b>34</b> | <b>100</b> |

Comments:

- I have never been near the Site.
- Strangely, unnatural colored water at Site and in Rockwood Brook
- Spillage in wetlands, eventually leading down to Sand Dam Pond
- Scrap metal and half buried debris
- Many barrels exposed
- Lots of litter including broken glass, car parts etc.
- Orange film on the sand at Sand Dam Pond

**Question 8. Do you feel outdoors activities near the Site are putting you at risk?**

| <b>Response</b> | <b>#</b>  | <b>%</b>   |
|-----------------|-----------|------------|
| Yes             | 20        | 58.8       |
| No              | 12        | 35.3       |
| No response     | 2         | 5.9        |
| <b>Total</b>    | <b>34</b> | <b>100</b> |

Comments:

- Fishing, swimming
- Personal wells should be tested during summer along with Pond

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- Still apprehensive about Pond even with testing
- Swimming, absorption through skin
- Gardening, water on garden to vegetables
- Walking and hiking
- Using recreational vehicles, ATV's, snowmobiles, dirt bikes

**Question 9. Have you smelled odors coming from the Site?**

| <b>Response</b> | <b>#</b>  | <b>%</b>    |
|-----------------|-----------|-------------|
| Yes             | 6         | 17.6        |
| No              | 25        | 73.5        |
| No response     | 3         | 8.8         |
| <b>Total</b>    | <b>34</b> | <b>99.9</b> |

Comments:

- Blasts of black smoke into air, soot fallout on cars and houses.
- The cloud of smoke and dust fallout seems to be worse during the warm months.

**Question 10. What is your general feeling about the Site?**

| <b>Response</b>              | <b>#</b>  | <b>%</b>   |
|------------------------------|-----------|------------|
| It does not affect my health | 8         | 23.5       |
| It does affect my health     | 11        | 32.4       |
| I am not sure                | 15        | 44.1       |
| <b>Total</b>                 | <b>84</b> | <b>100</b> |

**Question 11. What is your level of interest in this Site?**

| <b>Response</b>     | <b>#</b>  | <b>%</b>    |
|---------------------|-----------|-------------|
| Very interested     | 27        | 79.4        |
| Somewhat interested | 6         | 17.6        |
| Not interested      | 0         | 0           |
| No response         | 1         | 2.9         |
| <b>Total</b>        | <b>34</b> | <b>99.9</b> |

Comments:

- I hear loud explosion sounds at night and am unsure what it is.
- Avoid the area and you will be safe.
- Cannot protect self from air and smoke that blows around.

**Question 12. Do you have any other health-related questions or concerns about Troy Mills Site that you would like us to discuss in the Public Health Assessment?**

| <b>Responses</b>  |
|---|
| Make those responsible pay for the clean up   |
| What other tests are being done, other than those on sediments to ensure that the water at Rockwood Brook and Sand Dam Pond are safe? |
| What about the aquifer?   |
| What about the mill building, is it safe, or is there contamination there as well?  |
| How are the barrels being disposed of?  |
| Will this affect us in the future?  |

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|  |
|--|
| Tell us more and please explain.   |
| Please give a general description of the known health risk of the main chemicals.        |
| What is the future risk to the water table and the South branch of the Ashuelot Fishery? |
| What are the effects of pollution on water quality in area wells and Sand Dam Pond?      |

**Would you like your physician to be added to our mailing list?**

| <b>Response</b> | <b>#</b> | <b>%</b> |
|-----------------|----------|----------|
| Yes             | 43       | 38.7     |

**Public Health Assessment**  
**Troy Mills Landfill**  
Troy, Cheshire County, New Hampshire

**APPENDIX F**

**ATSDR Public Health Hazard Categories**

| CATEGORY / DEFINITION   | DATA SUFFICIENCY   | CRITERIA   |
|---|--|--|
| <b>A. Urgent Public Health Hazard</b><br><br>This category is used for sites where short-term exposures (< 1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.  | This determination represents a professional judgment based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made. | Evaluation of available relevant information* indicates that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse impact on human health that requires immediate action or intervention. Such site-specific conditions or exposures may include the presence of serious physical or safety hazards.  |
| <b>B. Public Health Hazard</b><br><br>This category is used for sites that pose a public health hazard due to the existence of long-term exposures (> 1 yr) to hazardous substance or conditions that could result in adverse health effects.                                       | This determination represents a professional judgment based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made. | Evaluation of available relevant information* suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclides) have had, are having, or are likely to have in the future, an adverse impact on human health that requires one or more public health interventions. Such site-specific exposures may include the presence of serious physical or safety hazards.                              |
| <b>C. Indeterminate Public Health Hazard</b><br><br>This category is used for sites in which <i>critical</i> data are <i>insufficient</i> with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.   | This determination represents a professional judgment that critical data are missing and ATSDR has judged the data are insufficient to support a decision. This does not necessarily imply all data are incomplete; but that some additional data are required to support a decision.                      | The health assessor must determine, using professional judgment, the Acriticality@ of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision. |
| <b>D. No Apparent Public Health Hazard</b><br><br>This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects. | This determination represents a professional judgment based on critical data which ATSDR considers sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.  | Evaluation of available relevant information* indicates that, under site-specific conditions of exposure, exposures to site-specific contaminants in the past, present, or future are not likely to result in any adverse impact on human health.  |
| <b>E: No Public Health Hazard</b><br><br>This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.  | Sufficient evidence indicates that no human exposures to contaminated media have occurred, none are now occurring, and none are likely to occur in the future  |  |

*\*Such as environmental and demographic data; health outcome data; exposure data; community health concerns information; toxicologic, medical, and epidemiologic data; monitoring and management plans.*